ECRONICON OPEN ACCESS

EC NURSING AND HEALTHCARE
Research Article

Microgalvanopuncture in the Treatment of Striae - Systematic Literature Review

Daiane Dos Santos[1]* and Naudimar Di Pietro Simões[2]

[1]*Physiotherapist, Postgraduate in Dermatofunctional Physiotherapy (IBRATE), Brazil*

[2]*Physiotherapist, Master in Science and Technology (PUCPR), Brazil*

***Corresponding Author:** Daiane Dos Santos, Physiotherapist, Postgraduate in Dermatofunctional Physiotherapy (IBRATE), Brazil.

Received: January 13, 2021; **Published:** February 10, 2021

DOI: 10.31080/ecnh.2021.03.00193

Abstract

Introduction: Striae is a cutaneous atrophy that arises from the rupture of elastic fibers that are located in the dermis, affecting 2.5 times more females when compared to males. The microgalvanic current is one of the most used techniques for the treatment of stretch marks, despite that, its results are still inconclusive.

Objective: Review in the literature the information about the microgalvanopuncture technique and its applicability for the treatment of stretch marks.

Method: This article consists of a systematic review, conducted from four electronic databases: Google Scholar, Scielo, PubMed and Virtual Health Library. The keywords used in the search for manuscripts were electrotherapy, striations, microgalvanopuntura and microgalvanic current. The original articles related to the theme were researched in Portuguese and English, between 2007 and 2018.

Results: The search resulted in twenty-one articles, however, only seven (33.33%) studies met the criteria necessary for inclusion in this review. All studies performed the random sampling process of the participants. Most studies (85.71%) presented a positive relationship between microgalvanopuntura and the treatment of stretch marks, indicating that the technique can be effective in improving aspects and perception of stretch marks.

Conclusion: The use of microgalvanopuntura in the treatment of stretch marks presents positive evidence regarding its clinical applicability, showing itself to be an effective technique for this specificity. However, it is suggested that further controlled studies be conducted comparing the intensities and technique of application.

Keywords: *Electrotherapy; Physiotherapy; Stretch Mark; Electroacupuncture*

Introduction

Striae is an integumentary atrophy that arises from the rupture of elastic fibers that are located in the dermis [1]. And according to the degree of evolution, they may suffer a color variation, appearing red at first and then whitish or lighter than the individual's skin tone [2-4]. It is found in both women and men however, it affects 2.5 times more women. The age range of incidence is between 14 and 20 years of age, with the most affected regions in the breasts, buttocks [5].

Stretch marks are said to be atrophic because they present a reduction in the thickness of the skin, resulting from the decrease in the number and volume of its elements and it is represented by dryness, thinning, less elasticity and thinning of the hair [6].

Guirro and Guirro [3], describe three theories in their studies: mechanical theory, infectious theory and endocrine theory. In mechanical theory, the main mechanism for the appearance of stretch marks is caused by excess fat in the adipose tissue, causing damage to the elastic and collagen fibers of the skin. Infectious theory, on the other hand, indicates that inflammatory processes would cause damage to elastic fibers. And finally, the endocrine theory says that the appearance of stretch marks appears as a consequence of some drugs chosen for the treatment of certain pathologies.

Agne [7] and Tehranchinia., *et al*. [8], on the other hand, say that although the appearance of stretch marks is frequent, its etiology is not known for certain, they only mention that the origin is due to the production of glucocorticoids, occurring most of the time during pregnancy, obesity and adolescence.

Based on the theory that elastic tissue does not regenerate, the treatment for stretch marks has always been questioned. However, the concept of treatment has been changing, as several studies with different treatments, including the use of galvanic current, have shown significant results [9].

For Machado [10], when applied correctly, the galvanic current plays an important role in therapeutic actions and the results can be of great significance and satisfaction. According to Bravim and Kimura [11]: The galvanic current is a continuous direct current, with constant flow of electrons and unidirectional. Maintains its polarity defined during application, with action at a more superficial level, and with intensity that does not vary in the unit of time.

The physiological effect of the galvanic current in the treatment of stretch marks is to cause an acute inflammatory process in the affected tissue, so that its repair can occur. The trauma caused increases the local metabolic activity, leading to the formation of collagen tissue and filling the degenerated area [12,13].

Created by Brazilian physiotherapists, galvanopuncture is a technique that aims to treat both red and white streaks. It is an invasive method, however, superficial, as the stimulations are performed on the dermal layer of the skin. It combines the mechanical stimulation of a needle and the electrical stimulation of a polarized microcurrent. The subdermal introduction of the needle generates an acute and localized inflammatory response that is exacerbated by the effects of the current. This causes changes at the cellular and tissue levels: collagen production, neovasculization, cell proliferation, return of painful sensitivity and, as a consequence, a wide improvement in the appearance of the skin [14].

Two techniques are used for puncturing with the use of galvanotherapy: transversal and punctiform. In the transversal technique, the needle raises the skin surface, without penetrating below the epidermis. In the point technique, also known as perpendicular, the needle is inserted into the skin vertically to the groove and with a depth of approximately 1 millimeter [14].

Aim of the Study

This article aims to conduct a literature review on the use of microgalvanopuncture in the treatment of stretch marks.

Materials and Methods

This article consists of a systematic review, conducted from four electronic databases: Google Scholar, Scielo, PubMed and Virtual Health Library. The keywords used in the search for manuscripts were electrotherapy, stretch marks, microgalvanopuncture and micro-

galvanic current. The original articles related to the theme were researched in Portuguese and English, from 2007 to 2018. The inclusion criteria included: investigation of the relationship between microgalvanopuncture and striation treatment, random sampling process of patients or experimental research, comparison between group with intervention and control group, and review articles. Studies that presented their year of publication lower than 2007 were excluded.

Results and Discussion

After consulting the databases and applying the proposed inclusion and exclusion criteria, 07 articles were classified for analysis. In table 1, the studies are presented in order to facilitate comparison with regard to the outcomes evaluated, characteristics of the intervention, type of stria and results.

Authors	n	Outcomes evaluated	Characteristics of the intervention	Stretch mark type	Results (effect)
Galdino, Dias, Caixeta (2010) [1]	01	Comparative analysis of the effect of microgalvanic current	100 µA; 10 applications	Atrophic	Decreased diameter and reduction of stretch marks depression.
Robonato, Martignago, Reilinger., *et al*. (2009) [12]	01	Use of galvanic microcurrent in stretch marks	50/100/150 mA? 8 Applications	Atrophic	Reduction in width and coloring more similar to skin color
White, Gomes, Mendonça., *et al*. (2008) [6]	01	Histological analysis effects of galvanopuncture does not treatment of stretch marks atrophic	Between 70 and 100 µA; 20 Applications	Atrophic	Increased thickness of the epidermis and large amount fibroblasts
Silva, Rosa, Silva (2017) [16]	10	Comparison of microgalvanopuncture and do microagulhamento	100 µA; 4 applications 1 mm; 4 applications	Atrophic	There was no difference between resources, however both showed effectiveness in results
Almeida, Diniz, Oliveira., *et al*. (2009) [17]	10	Comparison between scarification and punching techniques	300 µA; 4 applications. 150 µA; 4 applications	Atrophic	Puncture technique showed better results
Ferreira, Oliveira, Silva., *et al*. (2016) [18]	20	Effect of microgalvanopuncture and cicatricure anti-stretch marks body cream	400 µA; 10 applications	Atrophic	Association of chain with cream had better results
Figueiredo, Moura, Machado (2014) [15]	18	Comparison of galvanic current and placebo	70 µA; 8 applications. 0 µA; 8 applications	Atrophic	Both groups demonstrated an increase in the degree of satisfaction with the appearance of stretch marks, but there was no significant difference between the applications

***Table 1**: Summary of studies using microgalvanopuncture for the treatment of stretch marks.*

Galdino, Dias and Caixeta [1] conducted a case study comparing the use of microgalvanic current in the treatment of atrophic stretch marks. The patient presented atrophic striae in the lumbosacral region. For comparison, in the right hemibody of the region, the resear-

chers used the connected microgalvanic current apparatus and in the left hemibody of the same region, the device turned off. The device was modulated in 100 μA (microamperes) which according to authors, is indicated to start the punctures, which were introduced in parallel the stretch marks, punctured from 3 to 4 centimeters with permanence of the needle for 3 seconds. Then, puncture was performed with the device switched off in the left hemibody. This treatment was maintained for two months, being performed once a week and totaling 10 sessions. After the findings pre- and post-treatment were collected, the authors observed and compared the stretch marks that underwent treatment with the device on and off. They verified then that before treatment the image presented an unaesthetic aspect due to whitish and well-evidenced stretch marks. After treatment, she showed improvement in her visual and aesthetic aspect in the treated region mainly in the right hemibody where the treatment was performed with the device on. They also observed that there was a decrease in the diameter and reduction of the striae depression. The left hemibody where the treatment was performed with the device switched off, they noticed improvement, but not as satisfactory as that of the right hemibody.

Rebonato., *et al*. [12] performed a case report using the galvanic microcurrent in atrophic streaks. The region to be treated was photographed and the streaks were measured in mm with a tape measure. The right gluteus received treatment while the left gluteus was the control. The protocol used by the authors included, for each stretch, three applications with microgalvanopuncture in each session. In the first application, the intensity of 50 μA was used, 100 μA in the second and finally, 150 μA. They held weekly sessions with a minimum interval of seven days, totaling 08 sessions. At the end of the treatment, new photographs of the treated areas were taken, and observed that the streaks of the right gluteus that were treated with the galvanic current, were significantly leveled and softened, presenting a notable decrease in width and improving the quality of the skin where the striated tissue became firmer compared to the left gluteus.

White., *et al*. [6] evaluated the effects obtained in the treatment of stretch marks through galvanopuncture. The region selected for treatment was the right side of the pelvis, remaining the left for comparison and control. Were realized 20 sessions, one session per week, for four and a half months, lasting one hour each. The intensity used varied between 70 and 100 μA, according to the patient's painful sensitivity. To assess the effectiveness of galvanopuncture in the treatment of atrophic stretch marks, the researchers performed an analysis of the tissue affected by biopsy, before and after the twenty sessions.

Through microscopic analysis of samples obtained through biopsy, the authors observed several different morphological aspects of thin skin, in the area of pre and post-treatment stretch marks. The epidermis was shown thicker, and the dermis showed a large amount of fibroblasts and fibers, both collagen and elastic, mainly in the most superficial part of the dermis, where they were observed clusters. The number of blood vessels was also greater in the area of treated stretch marks.

Silva., *et al*. [16] made a comparison between microgalvanopuncture and microneedling techniques. They used 10 volunteers who had atrophic cutaneous streaks in different regions of the body. Photographic images of the striated areas were evaluated using classical and digitalized planimetry, analyzing the size of the striations and the subjective perception of improvement through a questionnaire. The intervention protocol occurred once a week for four weeks and the volunteers received the microgalvanopuncture and microneedling techniques on the right and left sides of the body, respectively. For the microgalvanopuncture technique, the intensity of 100 μA was used, and the application was carried out in only one stretch of the region chosen by each volunteer. The percutaneous collagen induction procedure with microneedling was performed using the roller device, composed of 540 needles of 1mm thickness in the region of the stria in a horizontal, vertical and diagonal direction in back and forth movements until the appearance of a uniform pattern of petechiae, varying according to the extension of the area. After the end of the application of the proposed protocol, new photographic images were taken and analyzed using planimetry. The researchers concluded that there was no significant difference between the techniques, but both presented satisfactory results.

Almeida., *et al.* [17] on the other hand, compared the techniques of application scarification and punctuation. The authors used eight volunteers with streak alba, who underwent four sessions of microgalvanopuncture in the gluteal region. The scoring and scarification

techniques were performed on the right and left sides, respectively. The evaluation of the results was carried out by measuring the length of the stretch marks in addition to the measurement of planimetry before and after treatment, and also by using a patient satisfaction questionnaire regarding the scarification and scoring techniques. The scoring technique consisted of introducing a needle with a thickness of 2.5 x 5.0 mm subepidermally, at 45° of angulation, puncturing the entire length of the stria. An intensity of 150 μA. The scarification method, on the other hand, consisted of sliding a 0.18 x 8 mm needle at 90º in relation to the skin surface, linearly 3 times in the same place, using an intensity of 300 μA. It can be concluded through this study that the use of the galvanic microcurrent showed positive results both in the scarification technique and in the punctuation technique. The scoring technique was superior to the scarification technique, with regard to reducing the area of the stretch marks measured by the planimetry method. However, there was no difference between the techniques when the length of the stretch marks was used as a variable.

Ferreira., *et al*. [18] investigated the effect of microgalvanopuncture associated with an anti-stretch mark cream (Cicatricure). The authors selected 20 women to compose the sample, which were divided into two groups: group A - 10 women treated with microgalvanopuncture with 400 μA intensity; group B - 10 women treated with microgalvanopuncture with an intensity of 400 μA associated with 2.5 ml of Cicatricureanti-striae cream. The research lasted for 10 weeks, where microgalvanopuncture was used once a week in each patient totaling 10 applications, and the treatment associated with the Cicatricureanti-striae cream comprised the application twice a day. To compare the pre and post treatment stretch marks, photographic images were used. The process for calculating the streak area occurred by delimiting the edges of the striations in the photos, which were collected during the treatment, where the number of pixels was counted, the average of the area of the 3 striations was calculated and compared to the time session from the first to the tenth day, and also between groups to conclude which group of patients showed the best progress. At the end of the research, the authors observed a significant reduction in the percentage of regression of the streak areas treated with the current associated with the cream when compared to those treated only with current.

Finally, Figueiredo., *et al*. [15] verified satisfaction with the use of galvanotherapy by comparing forms of puncture in relation to the appearance of stretch marks. The researchers selected 18 volunteers who had white stretch marks in the gluteal region. Participants were randomly assigned to two groups of nine participants each: galvanotherapy group (GG) and placebo group (GP). In the GG the streaks of the left gluteal region were treated with perpendicular puncture and the streaks of the right gluteus received a transverse puncture and a current intensity of 70 μA. In GP the treatment was carried out in the same way as in GG, however it was submitted only to the protocol with the current intensity at 0 μA, that is, without current passing. The application was performed in three streaks of each gluteus, selected according to the most affected area. The treatment lasted for two months, being carried out weekly at regular intervals of seven days, totaling eight sessions of approximately 40 minutes each. The evaluation of stretch marks before and after treatment was performed using an evaluation form, including the patient's identification and clinical form; a questionnaire containing a satisfaction scale regarding the appearance of the skin in the gluteal region before and after treatment and a comparative questionnaire between punctures, both quantified using a visual analog scale and photographic record.

At the end of the research, the authors observed that when the GP in the initial and final assessments were compared in isolation, as well as the GG in the same assessments, significant differences were noticed between the two assessments for both groups, suggesting that both treatment using only punctuation as with galvanotherapy offer good results in satisfaction levels regarding the appearance of stretch marks.

Analyzing the studies, it was possible to observe that the majority of researchers used women in their research. This reinforces Azulay's statement5 where he says that stretch marks affect about 2.5 more women than men. The average number of applications made was 9.14 applications and all authors used atrophic streaks in their analysis. Regarding the intensity used, a large margin was observed, ranging from 50 μA to 400 μA. White., *et al*. [6] used a range of 70 to 100 μA justified according to the patient's sensitivity and obtained satisfactory results. Ferreira., *et al*. [17] used 400 μA of intensity and also obtained positive results.

Regarding the evaluation criteria and the results, it is possible to observe that all of them presented positive results in the use of microgalvanopuncture, however, there is no consensus among the researchers studied. They present studies with low sampling, wide variation in intensity and number of applications.

Conclusion

Through the data presented in this study, it is concluded that the use of microgalvanopuncture in the treatment of stretch marks presents evidence of clinical results. The mechanism of action is based on the inflammation/repair process. The production of collagen is accelerated which results in the improvement of the quality of the skin and the softening of stretch marks in the treated areas. However, the number of experimental clinical studies is small, no controlled studies were found, and there is no consensus on the use of the intensity or form of application of this current. The sample size of each study was also small, with most of them being case studies. It is suggested, then, that new controlled studies be carried out comparing the intensities and application technique with a larger number of samples. This need is justified by the high incidence of this condition and the scarcity in the literature on this subject.

Bibliography

1. Galdino APG., *et al.* "Comparative analysis of the effect of microgalvanic current: case study in the treatment of atrophic stretch marks". *Electronic Journal Health CESUC* 1 (2010): 1-6.

2. Lacrimanti LM., *et al.* "Didactic course in aesthetics". São Caetano do Sul: Yendis (2008): 322-327.

3. Guirro ECO and Guirro RR. "Dermato-functional physiotherapy: foundations, resources, pathologies". 3rd Edition. São Paulo: Manole (2007): 391-408.

4. Kasielska-trojan A., *et al.* "Do body build and composition influence striae distensae occurrence and visibility in women?" *Journal of Cosmetic Dermatology* (2017): 1165-1169.

5. Azulay RD., *et al.* "Atrophic and sclerotic dermatoses". In: Hanauer L, Azulay MM, Azulay DR. Dermatology. 5. edition. Rio de Janeiro: Guanabara Koogan 11 (2008): 147-149.

6. White PAS., *et al.* "Effects of galvanopuncture on the treatment of atrophic stretch marks". *Physiotherapy Brazil* 9.1 (2008): 53-58.

7. Agne JE. "Santa Maria: Pallotti (2009).

8. Tehranchinia Z., *et al.* "Fractionated CO2 Laser in the Treatment of Striae Alba in Darker Skinned Patients – A Prospective Study". *Journal of Lasers in Medical Sciences* 9.1 (2018): 15.

9. Mondo PKS and Roses RF. "Effects of galvanic current on the treatment of atrophic stretch marks. Course completion work, University of Southern Santa Catarina-UNISUL, Tubarão-SC (2004).

10. Machado CM. "Practical electrothermotherapy". 4th edition. rev. São Paulo: Nilobook (2008).

11. Bravim A., *et al.* "The use of electroacupuncture in atrophic stretch marks: a bibliographic review. Specialisation monograph in acupuncture". Brasilia: Faculty of Education, Sciences and Technology-Unisaúde (2007).

12. Rebonato TA., *et al.* "Use of galvanic microcurrent in chronic atrophic stretch marks - case report". The 17th EAIC's Anais (2009).

13. Costa CF., *et al.* "Use of microgalvanic current for the development of two protocols for the treatment of albasstriae". Master's thesis. Federal Technological University of Paraná (2016).

14. Bitencourt S. "Treatment of albas stretch marks with galvanopuntura: beneficial for aesthetics, oxidative stress and lipid profile". Porto Alegre. Dissertation [Master in Cell and Moleular Biology] – Pontifical Catholic University of Rio Grande do Sul (2007).

15. Figueiredo SKS., *et al.* "Use of galvanotherapy in the regeneration of atrophic stretch marks: a pilot study on satisfaction with treatment". *Physiotherapy Brazil* 15.3 (2014): 207-213.

16. Silva ML., *et al.* "Analysis of the effects of the use of microgalvanopuncture and microneedling in the treatment of atrophic stretch marks". *Biomotive Magazine* 11.1 (2017): 49-63.

17. Almeida AZ., *et al.* "Comparative study of the treatment of atrophic stretch marks with galvanic microcurrent using scarification and pontution techniques. Article presented as a partial requirement to obtain the title of specialist in Physiotherapy Functional Dermato UCG/CEAFI". Goiânia (2009).

18. Ferreira VJDS., *et al.* "Effect of microgalvanopuncture and cicatricure anti-stretch marks body cream on the treatment of atrophic stretch marks". *Magazine Inspirar Movimento and Saúde* 11.4 (2016): 44-50.

Volume 3 Issue 3 March 2021